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PROGRAMME BUDGET FOR THE BIENNIUM 1992-1993

Status of technological innovations in the United Nations

Second annual report of the Secretary-General

I. INTRODUCTION

1. The General Assembly, at its forty-sixth session, by its resolution 46/185 B of 20 December 1991, requested the Secretary-General to prepare a comprehensive report on new technology projects in the Organization, including information on the steps taken to implement the recommendations of the Advisory Committee on Administrative and Budgetary Questions (ACABQ) regarding the implementation of new technology. The Assembly also requested that the views of Member States on matters relating to new technology projects be taken into account in the report.

2. The present report covers the most significant projects which have been undertaken since the issuance of last year's reports on new technology projects. Last session four separate reports were issued: on the status of technological innovations in the United Nations (A/C.5/46/1 and Corr.1); on the status of telecommunications activities in the United Nations (A/C.5/46/5); on the integrated management information system (IMIS) project (A/C.5/46/24); and on the optical disk storage and retrieval system (A/C.5/46/26). It should be noted that, although it was requested that the present report be a consolidated report on the above four subjects, the General Assembly in resolution 46/185 B also requested individual reports on the status of the IMIS and the optical disk projects.

3. In the attempt to present a comprehensive picture of all new technology projects, the present report includes areas of activity not emphasized previously. For the first time, a section has been included which shows how

computer technology has been used in peace-keeping projects. Another section deals with plans to protect the applications utilizing new technology from service interruptions which may occur in the event of a disaster.

4. This report first describes the technical infrastructure upon which new applications are built, including a brief review of how desktop technology is used in the Organization, the place of larger computers in the overall technological architecture and the role of the local-area and wide-area telecommunications networks (LANs and WANs). This is followed by a description of the most significant computerized applications now under development, with special attention to the use of computers in support of the steadily expanding mandate for peace-keeping operations. The report closes with a brief update on issues to be addressed in the near future.

II. TECHNOLOGICAL INFRASTRUCTURE FOR THE ORGANIZATION

5. There has been a continuous effort to enhance the technological infrastructure required to support computer-based applications. This infrastructure can be divided into three different types of technology: (a) desktop technology, which includes the microcomputers and their peripheral devices which reside on the desks of individual staff members; (b) larger computers (minicomputers, large microcomputers and mainframes) which contain data and facilities to be shared by groups of individuals; and (c) the communications technology (wiring, devices and software) which provides the connectivity among all the computers.

6. During the past year, the emphasis has been on enhancing the connectivity infrastructure by developing the networking and telecommunications capabilities necessary to carry both voice and data communications among all the major duty stations.

A. Deployment of desktop technology in the Organization

7. In prior reports on technological innovations, it was noted that the desktop strategy in the Secretariat was to provide each staff member whose work required some type of computing capability with the appropriate equipment, software and connectivity at the desktop. Desktop computing capability is regarded as a form of utility, as with telephone service. Installing a personal computer at an individual's desk results in a marked increase in productivity. The ability of the Secretariat to respond to increasing workloads with reduced staff would not have been possible without the investment in automation technology. Purchasing such equipment has become more attractive in view of the fact that the cost of the standard model of personal computer has decreased to less than $1,500 per unit (including start-up software). When equipped with a convenience printer, this amounts to a total equipment investment for a stand-alone configuration of approximately $2,000.

8. The equipment replacement programme, originally established at Headquarters in 1984, has enabled the Organization to keep current with new developments in technology. Under the programme, equipment which has been in constant use for more than five years is eligible for replacement. Existing procedures stipulate that funds for replacement are allotted upon the approval of a replacement plan which is submitted to the Technological Innovations Board (TIB) at Headquarters.

9. Equipment replacement programmes subject to similar controls have now been established for other duty stations. The replacement plan filed with TIB for 1992 has allowed the Organization to move forward with its programme of replacing older, narrowly functional, dedicated word-processing equipment with personal computers (PCs) which are networked together. In addition, the plan allows for the replacement of selected obsolete personal computers with ones which are capable of handling the more complex applications which are now required by some end-users.

10. During the past year, continuing efforts have been made, to the extent that resources permit, to place a standard model of PC on the desk of each staff member whose work requires one. Although more powerful models are available, the standard model which is now deployed satisfies the requirement of most PC users. Basic requirements for a PC are considered to include software for word processing, a spreadsheet or database package and connectivity to the individual's local area network. A thorough review is undertaken when a request for other than the standard PC is made to ensure that the request is justified and that unnecessary processing capability is not supplied.

11. It is also worth noting that organizational units which are still under-capitalized in terms of new technology are encouraged to include in their budget submissions provisions for equipment and software which can be demonstrated to support their work programme. The Electronic Services Division of the Office of General Services provides technical reviews of these requests prior to their inclusion in the drafts of the programme budget.

12. The two tables below show, for the new organizational structure, the ratio of personal computers to an estimate of the number of regular and extrabudgetary posts in the Organization, as of 31 December 1992. Table 1 shows information for departments at Headquarters; table 2 provides the same information for other duty stations, including regional commissions.

13. At Headquarters, the total number of PCs has increased 23 per cent, from 2,800 in 1991 to 3,450 in 1992; at offices away from Headquarters, the number has increased 127 per cent, from 2,470 in 1991 to 5,600 in 1992. Since some organizational units at other duty stations included the number of PCs in their field offices in their reporting this year, direct comparison of the total number between 1991 and 1992 may be somewhat misleading.

Table 1. Projected number of PCs and LANs at Headquarters

(As at 31 December 1992)

New York Headquarters/ Department	Number of PCs	Total posts	Ratio: PCs/posts	LAN: Number of servers	LAN: PCs on LAN
Executive Office of the Secretary-General a/	83	84	.99	0	0
Department of Political Affairs a/	212	286	.74	1	3
Office of Legal Affairs a/	77	141	.55	1	12
Department of Peace-keeping Operations	6	35	.17	0	0
Department of Humanitarian Affairs a/	21	24	.88	0	0
Department of Economic and Social Development a/	783	869	.90	11	206
Department of Public Information	232	362	.64	1	25
Department of Administration and Management					
Office of the Under-Secretary-General and other offices a/, b/	105	105	1.00	2	82
Office of Programme Planning, Budget and Finance	262	262	1.00	2	66
Office of Human Resources Management c/	256	209	1.22	5	80
Office of General Services a/	520	882	.59	11	213
Office of Conference Services	894	1 454	.61	11	141

a/ The total post figure represents posts at Headquarters only. The number of posts located in Geneva is summarized in table 2 under the heading UNOG/Other.

b/ Other offices included are Executive Office, Internal Audit Division, and other offices directly reporting to the Under-Secretary-General.

c/ The PC/post ratio exceeds 1.00 because it includes PCs used for training purposes.

Table 2. Projected number of PCs and LANs at duty stations

(As at 31 December 1992)

Duty station	Organization	Number of PCs	Total posts	Ratio: PCs/posts	LAN	
					Number of servers	PCs on LAN
Addis Ababa	ECA a/	465	778	.60	4	100
Amman	ESCWA a/	34	294	.12	0	0
Bangkok	ESCAP a/	380	738	.51	5	90
Geneva	DHA-UNDRO b/, c/	70	65	1.08	1	55
	ECE a/	129	215	.60	1	35
	UNCHR d/	60	104	.58	1	30
	UNCTAD d/	250	438	.57	2	100
	UNHCR b/	2 000	2 233	.90	19	800
	UNOG/Admin	227	538	.42	7	114
	UNOG/CS	275	771	.36	6	245
	UNOG/Other e/	23	51	.45	0	0
Nairobi	UNEP f/	420	843	.50	17	200
	UNCHS/HABITAT f/	146	190	.77	1	16
	Common Services g/	8	57	.14	0	0
Santiago	ECLAC a/, c/	611	587	1.04	4	400
Vienna	UNDCP	155	204	.76	4	155
	UNOV h/	190	375	.51	6	110
(N/A)	United Nations Information Centres i/	120	379	.32	1	5

a/ The total post figure includes posts in joint units with the regional commissions.

b/ The total post figure includes a number of posts located in the field offices.

c/ The number of PCs includes a number of PCs for field operations (DHA-UNDRO), or in the field offices (ECLAC).

d/ The total post figure includes the New York Liaison Office.

e/ The other offices included are the Internal Audit Division, the Department of Political Affairs and the Department of Economic and Social Development, which are administrated by the respective offices in New York.

f/ The total post figure represents posts in Nairobi only.

g/ The number of PCs for Common Services at Nairobi is an estimate.

h/ The figure for UNOV includes PCs and posts for other units in Vienna commonly administrated by the Division of Administration and Common Services.

i/ Including United Nations Information Services in Geneva and Vienna.

B. Developments related to shared computing equipment

14. In addition to the desktop equipment used by staff for individual tasks, there is a need for sharing larger systems for common databases, word processing and communications. During the past year, a significant number of medium- and large-sized personal computers, referred to as LAN servers, have been installed on local area networks (LANs), usually for work groups within a department. As a result, use of LAN-based applications has increased markedly throughout the Secretariat. The extreme right-hand columns of tables 1 and 2 above show the number of PCs connected to LAN servers at Headquarters and at other duty stations, respectively, as of 31 December 1992.

15. At Headquarters, the total number of LAN servers has increased 61 per cent, from 28 in 1991 to 45 in 1992, while the total number of PCs connected to LANs has increased 51 per cent, from 550 to 830. At other duty stations, the total number of servers increased 135 per cent, from 34 in 1991 to 80 in 1992, while the total number of PCs connected to LANs has increased by 251 per cent, from 700 to 2,460.

16. Another type of LAN server now being purchased for new technology projects is the UNIX server, named after the UNIX operating system under which it operates. UNIX servers are considerably more powerful than even the largest personal-computer LAN server. The UNIX servers are primarily being acquired to house large organizational databases, such as the IMIS and the optical disk, which require fast response to queries placed against these databases. Computers manufactured in this class of server carry the highest price/performance ratio available today.

17. The United Nations mainframe provides computing services to the various departments and offices of the Secretariat, to other United Nations organizations in New York, to United Nations offices and organizations at other duty stations and to permanent missions to the United Nations. These services include on-line services, such as application development, database information services, electronic mail and the ability to reach other computers outside the United Nations using commercial networks. There are now over 3,000 users registered to access the system, of which 300 can access the mainframe simultaneously. The present computer was acquired in 1987, and was recently upgraded to keep up with increased demand for computing services. During 1992 the mainframe support staff have concentrated on improving the efficiency and security of this machine and have implemented an ongoing programme of capacity planning.

C. Infrastructure for networking and telecommunications

18. The infrastructure which allows for connectivity between individuals and between duty stations is one of the most important and complex characteristics of technological innovations in the United Nations today. The following review highlights the major developments in networking and telecommunications which occurred in the Organization during 1992. The continuing effort to

establish a comprehensive, global telecommunications network for the Organization remains one of the highest priorities of the technological innovations activities.

The infrastructure at Headquarters

19. Before discussing new developments in the efforts directed at establishing connectivity among the various duty stations, it is first necessary to emphasize the importance of providing a telecommunications infrastructure which can handle both voice and data communications within each individual duty station. As a first step in the creation of a modern, digital communications infrastructure at Headquarters, a digital telephone switch (PBX) capable of handling both voice communications and limited data communications was installed at Headquarters in 1987.

Local area network wiring at Headquarters

20. The second step in the formation of an updated telecommunications infrastructure at Headquarters is the establishment of a comprehensive wiring plant to carry both voice and high-speed data traffic vital to the success of a number of high-priority projects. One of the projects being undertaken at Headquarters from the total appropriation under section 35 of the programme budget for the biennium 1992-1993 is the implementation of the first phase of the installation of the necessary wiring for LANs. It is expected that this project, the cost of which is estimated at $6 million, will be completed by the end of the 1994-1995 biennium.

21. One of the most critical projects whose design is fully dependent on the installation of LAN wiring is the IMIS project. The project's schedule calls for full implementation at Headquarters by the end of 1993, with the first operational release of the system due at the end of 1992. The investment made in the project can be realized only upon installation of LAN wiring.

22. Two other projects, both in the Office of Conference Services, are also fully dependent on the presence of LAN wiring in those parts of the Secretariat where staff must access both indexes to documents and the full text of documents. The Dag Hammarskjöld Library's new library management system (for bibliographical information) and the optical disk system (for full text storage and retrieval of United Nations documents) are both LAN-based.

23. The situation in other substantive offices is analogous to that in the administrative areas. The Department of Economic and Social Development has a number of LAN-based applications in process. Other offices, such as the Executive Office of the Secretary-General, the Department of Political Affairs and the Department of Public Information, are also planning for the implementation of LAN-based applications which require their locations to be properly wired.

24. Virtually all parts of the Secretariat need to share documents and files. Personal computers operating on LANs are considered the most effective

replacement of the decade-old, dedicated word-processing technology. Political offices need, on a daily basis, to draft and edit correspondence, reports and documentation presented in support of conferences and meetings. For example, a local area network would enable the Office of Legal Affairs to take advantage of computerized legal databases and other computer applications which are becoming widely used in the legal profession. Offices throughout the Secretariat need to be able to exchange information electronically using electronic messaging capabilities available only in a LAN environment.

25. The wiring which the Office of General Services is installing represents the latest technology and is expected to be fully functional for high-speed data transmission well into the twenty-first century. This wiring will replace older wiring which has been in the United Nations buildings since the 1970s, and which is now technologically obsolete. The technology to be used for the new wiring employs a special type of cable which is connected from individual personal computers to hub units strategically located on each floor. These units are, in turn, connected by a fibre-optic backbone cable running vertically through each of the buildings in the Headquarters complex. The first phase of the wiring project, which involves wiring approximately 60 per cent of the Headquarters offices, is expected to be completed at the end of the 1992-1993 biennium. Project cost is anticipated to be within original estimates for phase one.

Wiring infrastructure at offices away from Headquarters

26. At present there is an effort under way to modernize local communications systems at other duty stations. The installation of new communications cabling will provide the basic infrastructure of LAN connectivity suitable for carrying both voice and high-speed data traffic. Programmes at the Economic and Social Commission for Asia and the Pacific (ESCAP), the Economic Commission for Africa (ECA), the United Nations Office at Geneva, the United Nations Office at Vienna and the United Nations offices at Nairobi will benefit directly from this modernization programme, because nearly all new computer applications rely heavily on the presence of such cabling infrastructure.

27. The United Nations telecommunications network currently serves 15 cities internationally. It is comprised of a diversity of transmission facilities - owned both commercially and by the United Nations - which provide voice, telex, facsimile and data communications services. Major network centres that provide a full range of services are located in New York, Geneva, Bangkok, Addis Ababa, Vienna, Santiago and Nairobi. Major peace-keeping centres supported by the network are located in Jerusalem, Naquora, Nicosia, Luanda, San Salvador, Kuwait City, Islamabad and Baghdad. The figure at the end of the present report provides a graphic representation of the United Nations telecommunications network.

Transition to an all-digital telecommunications network

28. The process of upgrading the United Nations telecommunications network from analog to digital technology began with upgrades to the links between United Nations Headquarters and Geneva, Vienna and Santiago in 1989 and 1990. Voice channel capacity was increased fivefold and data channel capacity was doubled for approximately the same cost as the alternate voice data (AVD) analog transmission technology. These upgrades yielded the added benefit of allowing for simultaneous voice and data transmission. Moreover, the digital transmission systems currently in place have proved to be far more reliable than were their analog counterparts, providing a significantly higher level of network availability and resulting in both increased efficiency and productivity.

29. Upgrading of existing wide-area transmission facilities continues. Following the implementation of the additional upgrades between New York and Geneva, Vienna and Santiago in 1991, the link between New York and Bangkok was upgraded in the first quarter of 1992, providing additional voice channel capacity and increased data throughput and assuring the IMIS and optical disk projects the necessary communications support required in terms of both capacity and reliability. Efforts to implement upgrades between New York and Nairobi and Addis Ababa by the deployment of digital Earth stations are currently under way.

30. Additionally, because of significant technical and financial benefits of digitalization, the existing network of Earth stations currently employed in support of United Nations peace-keeping operations is being gradually retrofitted for digital operation. The modest capital investment costs for new electronics is providing a three- to five-fold increase in channel capacity while current operating costs for satellite power have remained relatively constant.

31. As an integral part of continued efforts to convert the existing telecommunications infrastructure to a digital format, the United Nations is undertaking a comprehensive replacement and modernization programme with respect to the voice communications systems at United Nations offices in Geneva, Vienna, Addis Ababa, Bangkok and Nairobi. Obsolete telephone technologies no longer capable of reliably supporting the offices they serve are being replaced by modern digital switching systems. Procurement action for these systems has already been initiated, and full implementation is envisaged within the current biennium.

32. It should be noted that telephone systems have traditionally been regarded as useful only to the local office in which they are installed. This is no longer valid. The local telephone switches have become an important extension of the United Nations global communications infrastructure. As service demands imposed on the network grow, the role of the local telephone exchange in providing access to cost-effective services on the global network will become increasingly important. Direct dialling between geographically dispersed offices on the United Nations network, for example, is not merely a

convenience; it has proved to contribute to more efficient utilization of network services by drastically reducing queuing due to the manual nature of operator assistance.

33. Under current series of new procurements for modern voice communications systems, integration and networking capabilities represent major aspects of the system specifications. The intent is to ensure that common standards for networking are implemented in order to guarantee compatibility and inter-operability between the various voice communications systems, and enhancing network capabilities and features.

Data communications

34. The existing data communications network does not lend itself readily to the support of distributed LAN-based applications. These new applications have made it necessary to begin implementing the next generation of data communications networking technology (termed packet-switched data networks). The packet-switched networks offer greater connectivity and sharing of host resources and transmission facilities among multiple users. The technology also provides for standardized network access, independence from proprietary single-vendor solutions, and standard interfaces to public data networks.

35. Having identified the need for more advanced data communications support, the United Nations plans to embark upon a programme within the current biennium to replace the existing data network facilities with packet switching equipment. The deployment of these new facilities will serve to modernize the existing data communications infrastructure to support a wide range of new applications. The packet switching network will eliminate the limitations of the existing data networking equipment and significantly improve the capability for transferring and routing data, electronic mail and files between a diversity of locations.

Messaging

36. For decades, telex messaging has represented a core network service and a major cost component of the telecommunications budget. In recent years, however, the proliferation of facsimile machines and the advent of public electronic mail services have given rise to more cost-effective alternatives to telex messaging. It should be noted, however, that telex as a communications medium is not expected to disappear in the near future, because in many countries in the developing world it remains the primary form of communication.

37. In order to exploit the benefits of alternative messaging technologies, the United Nations is in the process of updating its global messaging infrastructure. To date, a conversion facility on the current telex message switching system converts 60 per cent of telex messages to the less expensive facsimile format. The acquisition of a new facsimile switch to augment services on the current message switching system will provide further message handling enhancements, giving rise to productivity gains from automation and more cost-effective use of facsimile machines in the Organization.

38. The United Nations has been in consultation with the specialized agencies of the United Nations system through the Advisory Committee for the Coordination of Information Systems (ACCIS) as well as other forums to achieve this end. The consultations have led to a promising collaboration between the United Nations, the United Nations Development Programme (UNDP) and the World Bank in a series of pilot projects. Consultations with other organizations in the common system will continue with a view to establishing a new global messaging architecture by the end of 1993.

D. Plans for protecting new technology from service interruptions

39. Protecting information systems from service interruptions is an area to which special priority has been accorded since the last report. Both external and internal audits of the computing facilities have resulted in recommendations that the Secretariat immediately begin taking steps to ensure that vital information in electronic form be as fully protected as resources allow. In addition, a strong interest exists on the part of users in improving the reliability of the information systems over which they have custodial responsibility.

40. As the Organization increases its dependence on electronic information systems, it is evident that greater emphasis must be placed on risk avoidance. Any unforseen event, such as damage to the premises from a fire or a severe water leak, could render critical information systems inoperable. In order to counteract this problem, the Organization has begun formulating and implementing strategies to protect each major system platform: mainframe, LAN server (or minicomputer), and telecommunications.

41. For the mainframe system, a statement of direction for overall protection has been issued, defining three levels of service interruption and corresponding countermeasures. The first phase of implementation has begun. Functional requirements have been defined and work is under way to select a contractor to provide off-site recovery services. The target date for the completion of phase I is the first quarter of 1993.

42. For the LAN platform, a manual has been drafted which instructs users how to recover their systems. It outlines security precaution guidelines, system backup guidelines, detailed recovery procedures and site restoration procedures. Protection from computer viruses is also being addressed in this context. The manual is expected to be presented shortly to the Technological Innovations Board for its approval and endorsement, after which it will be circulated to all duty stations as a standard.

43. For UNIX servers and telecommunications, technical studies are currently under way. Once recovery strategies for all system platforms are in place, even if an unforeseen disastrous event occurs, the information systems will be able to provide interim services with minimal disruption, so that the Secretariat will be able to continue its work.

44. The development of strategies to protect systems from service interruptions is considered an ongoing project. At this point, it is felt that the Secretariat can be made safe from major unforeseen events on the mainframe and LAN platforms. Continuing efforts will be made to enhance these areas, while high priority will be placed upon developing recovery strategies for other aspects of electronic technology.

III. APPLICATIONS OF NEW TECHNOLOGY WHICH ARE INSTALLED, PLANNED OR UNDER DEVELOPMENT

45. As can be seen from the preceding paragraphs, a great deal of research and planning has been done to ensure a consistent infrastructure which will support applications systems being developed during the current biennium, and which will continue to be developed into the next decade. The standards which have been adopted to implement this infrastructure impose a very high degree of uniformity as new applications emerge. In addition, the Technological Innovations Board has played a significant role in setting standards for new technology and for establishing policies in this area. To ensure conformance to TIB standards, procedures have been implemented whereby all new applications of new technology are submitted for review by the Electronic Services Division of the Office of General Services prior to any major procurement action.

46. In the review of new applications, every effort is made to utilize standard hardware and software platforms, and if telecommunications services are involved, to use existing networking facilities. For example, when it is necessary to use word-processing functions within a financial application (as is done in the IMIS project), the United Nations standard word-processing package is used. This is also true of the optical disk project, where all of the interfaces are being developed in conformity with standards set by TIB.

47. Without exception, applications being implemented in the LAN environment are being developed with the end-users' convenience in mind. Much thought is being given to making the applications user-friendly. Nearly all applications currently being developed will operate in a graphical (rather than textual) mode, in what is termed a "windows" environment. With a pointing device, called a mouse, the user can quickly move to any part of the computer screen and select the data to be processed. The windowing technique allows users to have more than one application available simultaneously and to move easily from one application window to another. Computer support services at each of the duty stations are now planning for the large-scale introduction of windows technology and the concomitant training of users that this implies.

A. Applications with global impact

Word processing

48. As mentioned in the last progress report on technological innovations (A/C.5/46/1 and Corr.1), there are a number of new computerized applications in the process of being implemented in the Secretariat. Some of these affect nearly all staff and can only be fully implemented over a relatively long period of time. One such project is the global transition to the United Nations standard word-processing package. The movement to this new technology has required careful planning. The training of large numbers of staff has extended over several years.

49. The critical point has now been reached where the majority of word-processing users have been retrained to use the new product. At Headquarters, the Office of Conference Services of the Department of Administration and Management expects to move its entire document production process to the new standard before the end of the 1992-1993 biennium. Nearly all substantive departments have adopted the new standard and are in the position of being able to submit documents to the Office of Conference Services in the new format.

Electronic mail

50. Another project requiring long-term implementation is the introduction of a global electronic mail (E-mail) facility. Using the United Nations own telecommunications facilities, the Electronic Services Division of the Office of General Services of the Department of Administration and Management has been involved in testing E-mail packages for the different computer platforms (microcomputers, minicomputers and mainframes) which exist in the Organization. There are several options which allow the different E-mail products to be interconnected. One of these, known as the X.400 protocol, permits messages and files (text and data) to be exchanged electronically across divergent computer platforms.

51. The X.400 facility allows the United Nations to use a number of commercial as well as non-commercial arrangements to connect the various E-mail products available in the Organization to other organizations, such as UNDP and the World Bank, as well as to entities outside the Organization where the service is available. A product which runs primarily on the United Nations mainframe computer was selected to provide connectivity to E-mail products running on LANs minicomputers, and other mainframe computers, such as the International Computing Centre (ICC) in Geneva. Linkage to X.400 networks is also provided through this product.

52. With the emergence of LAN technology, PC users need an electronic mail package which provides them with a facility which integrates well with their other desktop applications. For example, it is often desirable to insert the contents of a spreadsheet table into a word-processing document. After a thorough study by a TIB task force, an E-mail product has been selected and

approved as a standard for use at Headquarters. An inquiry is now under way to determine whether the Organization can standardize this product for use at other duty stations as well. It should be noted that one of the constraints against setting organization-wide standard products is the availability of support for those products at all duty stations in the system.

53. The possibility of using E-mail as an alternative to telex messaging is also being actively pursued. The difficulty with this undertaking, however, has been that for several years, while E-mail technology was in its infancy, the market erupted with a wide range of proprietary systems. For the past nine years or more, inter-operability was a major issue which threatened the viability of E-mail as an alternative global messaging medium. The promulgation and industry-wide acceptance of standards for message handling systems, however, now offers a broad range of new opportunities for reducing messaging costs in the United Nations global messaging infrastructure.

Internet

54. Another networking facility which will allow users to connect electronically to other organizations is being established on an experimental basis this year. The connection is to the Internet, a network of non-commercial organizations, which now extends to several thousand individual computer networks world wide. The first phase of the project will allow E-mail users within the Organization to exchange messages and data files with users who are on the global Internet. It is expected that this will be especially useful in the exchange of economic and statistical data between national Governments and the various offices in the Organization which are responsible for compiling economic and social data.

Integrated management information system

55. Perhaps the most significant application of new technology now under development is the integrated management information system, a Secretariat-wide application which will provide computerized control of the United Nations internal administration. IMIS will process data relating to the most important aspects of personnel management, financial management and such administrative tasks as inventory control and procurement. IMIS is scheduled to become partly operational early in 1993 with software Release 1, which will include many of the personnel management functions as well as the genesis of the financial modules to be implemented fully in later releases.

56. The phased introduction of IMIS will allow for a gradual introduction of technologies new to the Organization. All critical modules will be in place at Headquarters by the end of 1993, and phased in at other duty stations starting in 1994. The IMIS platform makes what most experts consider to be the best use of available computing capability in the Organization, that is, LAN technology, PCs at the desktop using a windows environment and powerful UNIX servers to house a single integrated, relational database.

57. As the Release 1 implementation date approaches, many critical decisions are being made. Users of IMIS have been identified and will receive upgrades to their equipment in cases where this is necessary. Training programmes for the initial users are being established to familiarize them with the new technology. Equipment purchases are being made to ensure the right mix of LAN servers to support the new applications. Support staff to install and operate the IMIS programs have been identified.

58. It is expected that the benefits to accrue from IMIS to the United Nations alone will be significant since, management will for the first time have a degree of control over its finances and resources which is simply not possible using the fragmented, mainframe-based systems which were developed over the last 10 to 20 years in complete isolation from each other. IMIS is expected to provide consistency and accuracy in the processing of administrative actions.

59. Since the IMIS project is being reported upon in a Fifth Committee document to be issued subsequently (A/C.5/47/...), the information included here is intended to show only the extent to which this application effectively builds upon the investment in infrastructure already made by the Organization. A panel of independent experts also submitted a report on IMIS to ACABQ in August 1992, as mandated by the General Assembly in its resolution 46/185 B.

Optical disk

60. At its forty-fifth session session, the General Assembly approved in principle the implementation of phase I of an optical disk document storage and retrieval system for United Nations documentation. With the implementation of phase I under way, the General Assembly at its forty-sixth session requested that the Secretary-General submit a detailed performance report to ACABQ at the completion of phase I. The Assembly also approved the resources and plans for phase II in 1992-1993 contingent on the report on phase I.

61. The optical disk will serve as a central repository for documents, official records and reference material to be accessed by a wide population of users from within as well as outside the Secretariat. In cases where direct access to the optical disk system via telecommunications links is too costly or impractical, CD-ROM technology will be used to distribute materials electronically.

62. Since it is planned that nearly all documents and official records will be processed electronically from creation through on-screen editing and translation to electronic publishing, the optical disk system will serve as the repository for work in progress. This will eliminate paper and diskettes, which are being moved from desk to desk between the document processing stages today. This will also help equalize workloads in document processing between different duty stations by making work in progress available electronically through the United Nations global telecommunications network.

63. The implementation of optical disk has begun with the acquisition of optical storage equipment, UNIX servers and software for Geneva and New York, including the retrieval workstations and networking components. Installation was completed at both sites, Geneva and New York, in January 1992, and installation of customized application software was completed in June; systems training was also provided to selected staff at Headquarters and Geneva. The three month period of operational testing leading to final acceptance began in July at both sites. Inter-divisional project teams have been formed in Geneva and New York to ensure that all divisions participate actively during the installation to review and modify work flows, functions and procedures in order to obtain the expected benefits from the system.

64. A special briefing for the missions of Member States was held in March to describe the status of the project and to provide, through an exchange of information, detailed specifications on equipment, software and communication links for missions and the Secretariat to work towards the planned access to the system for missions in New York during phase II of the implementation.

65. In order to avoid the storage of the same or similar data on documents and publications in several places, it is planned to integrate the optical disk system with other document tracking and indexing systems now used elsewhere in the Office of Conference Services. The optical disk system conforms to the new strategy for technological innovations in the Secretariat which is based upon open systems architecture, and uses international standards for storing, retrieving and transmitting text and image documents.

B. Specialized applications

66. In addition to the high-visibility global projects outlined in the paragraphs above, a number of other projects of more limited scope are under development. Because of time constraints, an exhaustive survey of systems development activities was not undertaken for the present report. Nevertheless, a few noteworthy activities are summarized in the paragraphs which follow.

67. It should be noted that all of the systems which have been completed recently or are presently under development will utilize new technology platforms, that is, LAN technology, personal computers at the desktop and one or more server-type computers on which the specialized database is located. This technology is fully compatible with that used by IMIS, thus ensuring a consistent, easily supported framework within which all new systems will be operating.

68. The Department of Political Affairs is currently developing a computer-based system, the United Nations Disarmament Affairs Information System (UNDAIS), which is expected to provide the necessary tools required to respond to the needs of a variety of potential users in an efficient and timely manner. It is also expected to provide Member States with a high-quality reference base of disarmament-related information and data which

can be accessed from their remote locations. The indexed collection, which will include documents and publications in multiple languages in both text and image formats, will be updated on a daily basis. Similar to other new applications, the hardware configuration is based upon a local area network consisting of several servers on which the database will reside.

69. The Office of Legal Affairs is responsible, under Article 102 of the Charter of the United Nations, for receiving and processing treaties submitted with the Secretary General as depositary and for treaties submitted to the United Nations for registration. Information in multiple languages about these treaties is contained in a series of publications issued by the Office of Legal Affairs on a regular basis. An analysis is currently under way to determine the feasibility and costs of putting the 1,500 volumes containing the full text of these treaties onto CD-ROM for distribution, and to make the full text accessible on-line via a computer system. Both approaches would utilize an index to aid users in searching through the approximately 600,000 pages of text and image.

70. A study is also being undertaken to determine whether the yearly publication on Multilateral treaties deposited with the Secretary-General, which contains full descriptive data and all subsequent actions for those treaties for which the Secretary General acts as depositary, can be upgraded from its existing word-processing environment to a more efficient and modern document publishing environment. It is envisioned that LAN technology will be used to support this publishing system in a shared environment. The two types of indices which cover all treaties and subsequent actions are being examined for ways to improve their creation, maintenance and availability.

71. The Division for Palestinian Rights of the Department of Political Affairs serves as the secretariat for the Committee on the Exercise of the Inalienable Rights of the Palestinian People and carries out its functions in consultation with and under the guidance of the Committee. The General Assembly, in its resolution 46/74 B of 11 December 1991, requested the Secretary General to provide the Division with the necessary resources, including a computer-based information system, to assist the Committee and the Division in the performance of their various mandates.

72. The United Nations Information System on the Question of Palestine (UNISPAL) will be LAN-based and will store large amounts of textual information pertinent to the question of Palestinian rights. The system will provide for the rapid search and retrieval of information as well as preparation of an annual report and statements for conferences and meetings. UNISPAL will also provide quick access to on-line news services which would facilitate the preparation of communications and statements addressing urgent developments.

73. With the increasing number of peace-keeping missions, it became apparent that a computerized health management system would help the Medical and Employee Assistance Division of the Office of Human Resources Management of the Department of Administration and Management to expedite the administrative

and medical processes for medical clearance, patient visits, immunizations and sick-leave certification. As with other newly acquired systems for specialized applications, the selected health management system is a LAN-based application that uses UNIX servers to store medical records and other data relating to the day-to-day operations of the Medical Service. By using electronic patient records, medical staff will be able to treat, immunize and clear staff for travel more efficiently than manual files permit. The Medical Service will now be able to maintain a database of key statistics on its employee-patient base and perform epidemiological analyses, which will allow the medical staff to develop strategies for dealing more efficiently with staff medical problems.

74. A new computer access system is being installed at Headquarters to facilitate the work of the Security and Safety Service of the Office of General Services, which is responsible for controlling access to the United Nations premises and ensuring the physical safety of staff, members of national delegations and others who must enter the area. The United Nations Access Control System (UNACS) will control both pedestrian and vehicle entry and exit to and from the United Nations complex. Personal data as well as the individual's image will be stored in the computer, permitting immediate issuance of electronic identification passes. For staff with parking privileges, the system will also be programed to accept the same identification card for vehicle entry. The system also processes any parking charges and issues invoices.

75. Another computerized system with organization-wide implications is the proposed library management system, which will replace the older mainframe-based United Nations Bibliographic Information System (UNBIS). The Dag Hammarskjöld Library of the Office of Conference Services of the Department of Administration and Management is acquiring a turnkey system which will meet the requirements for storage and retrieval of information concerning the United Nations' specialized collections. Rapid access to bibliographic information is needed not only by United Nations staff, but also by delegates and other mission staff engaged in researching questions related to the activities of the Organization.

76. It is expected that the library system will also be capable of managing a number of the Library's internal operations, such as the control of materials which are lent to library clients, the acquisition of all types of bibliographic materials and the cataloguing and indexing of materials which will be registered in the composite database. It is also necessary to provide a direct linkage between the new library system (wherein indexes to United Nations documents will be maintained) and the optical disk system (which will contain the actual text of documents).

77. It is expected that certain of the systems described above (e.g., medical and security control) and, to a certain extent the library system, will interface with IMIS. This will allow these systems to take advantage of information which needs to be available for more than one purpose. For example, the medical and security systems can take advantage of personnel data

recorded in the IMIS database in order to avoid having to re-input these data. Wherever possible, policies will be established which promote a coordinated approach to the development of new information systems.

78. In addition to the specific substantive applications described above, there has been an increase in the use of new technology to perform a number of administrative tasks related to the work programme of particular organizational units. Desktop technology is now being used extensively to maintain mailing lists, to provide inventory control of publications and correspondence, to schedule events and to provide desktop publishing capabilities to substantive offices. Where utilized, this has brought about increased efficiency and improved programme delivery. The technical support staffs at individual duty stations are striving to achieve solutions which enhance productivity available to larger numbers of end users by use of training programmes and information circulars and through contacts with technology focal points in the departments.

IV. USE OF COMPUTER TECHNOLOGY FOR UNITED NATIONS PEACE-KEEPING OPERATIONS

79. With recent dramatic changes in international affairs, the United Nations has seen an unprecedented increase in its functions and responsibilities, while being called upon to perform duties that were never envisioned, or for which the Organization was not prepared. Coincidentally, the United Nations commenced an ambitious programme to computerize as many of its functions as possible, with the aim of making it a more responsive, cost-conscious and effective enterprise. The migration to personal computers also pervaded some peace-keeping missions, where they were used with commercial packages as well as for mission specific requirements (i.e., testing of communication transmitters).

80. The United Nations Transitional Assistance Group in Namibia (UNTAG), which began in early 1989, was the first mission where personal computers were extensively employed. Post-mission briefings clearly demonstrated the effectiveness of using electronic equipment, while also pointing out the types of difficulties which such use would necessarily entail (dust, erratic power sources, lack of training, and so on).

81. As new missions such as the United Nations Observer Group in Central America (ONUCA) and the United Nations Observer Mission in El Salvador (ONUSAL) were authorized, the degree of computerization of basic services increased dramatically, with additional initiatives in such difficult and technically sophisticated areas as local area networks and high-frequency data transmitters/receivers. In addition, and of greater importance, strategic planning for existing and future missions was begun at the Field Operations Division of the Office of General Services of the Department of Administration and Management at Headquarters in May 1991.

82. The basic aims of the systems planning group in the Field Operations Division were to ensure the proper certification and compatibility of both hardware and software for every mission, the gradual integration of all items, the troubleshooting of specific problems not solved at the mission level and the installation of specially designed accounts, payroll and procurement packages. The purpose of these packages is to ensure the proper and timely administration of a mission, to increase efficiency and response time and to tighten fiscal and logistical controls. Some or all of these packages are now being utilized in the United Nations Iraq-Kuwait Observation Mission (UNIKOM), the United Nations Protection Force (UNPROFOR), the United Nations Transitional Authority in Cambodia (UNTAC) and the United Nations Guard Contingent in Iraq (UNGCI). The Field Operations Division systems group coordinates with other units of the Organization to ensure that all electronic technology introduced at the mission level will be compatible with existing standards and with IMIS.

83. The Field Operations Division has been heavily involved in devising a "crisis kit". The purpose of such a kit is to have the finance, procurement and logistics packages already loaded on a portable server, with battery-powered laptop computers and printers, generators, wiring and all necessary consumable items prepackaged and ready to go in a standard airline container. In an emergency and/or at the start of a new mission, the container will be flown with the first team out, which will then be able to set it up with minimum effort. This will not only ensure proper administration procedures from the start, but will also make the work of those involved much more effective. Some containers will be ready for deployment by early next year.

84. UNPROFOR and UNTAC, the most demanding operations undertaken by the Organization in recent years, have benefited greatly from all the planning and the lessons learned from other operations. These benefits, however, did not come without difficulty (particularly in Cambodia), with respect to the set-up of the proper environmental conditions (power supply, line conditioners, modem lines and so on) and the timely delivery of equipment. Additionally, all these extraordinary demands have put a premium on the ability of the Field Operations Division to provide the necessary level of support; steps are being taken to improve the number of trained and capable personnel, and new ways are being examined to improve the value and effectiveness of the equipment procured.

85. Concurrent with the existing level of operations, the Field Operations Division is heavily engaged in the strategic and tactical planning of its future use of new technology for its Headquarters operations as well as for both established and upcoming missions. Special emphasis is being placed upon ensuring that the responsible staff are trained and have actual field mission experience so that they can properly evaluate, implement, provide training for and troubleshoot any equipment procured.

86. Telecommunications support for peace-keeping remains an area of major focus in the Organization. As the United Nations operational role continues

to expand and new peace-keeping centres are established, the need for the timely and effective response to tactical communications requirements becomes increasingly important. A larger number of remote areas, often devoid of any public or private telecommunications infrastructure, require communications services both within the mission area and with Headquarters on short notice.

87. Accordingly, the United Nations is now using rapid-deployment communications kits consisting of transportable Earth stations equipped with such ancillary equipment as telephone systems, packet switching equipment and computerized message handling systems. The objective is to employ highly reliable, lightweight, moderate-capacity communications subsystems in standardized configurations which can be delivered within 24 to 48 hours by air transport to new peace-keeping centres and which, within a few hours of arrival, can be installed as new stations on the network.

88. It is envisaged that this approach will improve response times for satisfying new operational requirements by substantially reducing planning, engineering and implementation schedules and enabling lower communications costs through optimized use of satellite technology. Additionally, it will provide greater communications capacity and a full range of services currently not available.

89. Although peace-keeping operations present many special problems for systems designers, many of the standard administrative functions required to manage peace-keeping projects will be incorporated into IMIS. This will result in the adoption of uniform procedures for handling personnel and financial data in field offices. Standard data entry and reporting formats can be established to ensure consistent data exchange between field offices and Headquarters. The addition of data concerning field projects into the IMIS database is expected to provide management with a global view of its operations.

90. To achieve this degree of integration, it will be necessary to connect all overseas operations to the telecommunications network. Within a few years data and voice communications from all points of the globe will be not only feasible but a practical reality. This is expected to increase the impact and effectiveness of the Organization in its peace-keeping operations.

V. FUTURE DIRECTIONS IN THE USE OF NEW TECHNOLOGY

91. Although it is relatively difficult to foresee all of the technological innovations which may affect the work of the Organization, it is possible to identify broad, general areas which are expected to yield benefits to the Organization. Some of these broad objectives have already been identified for inclusion in the medium-term plan for the period 1992-1997. 1/ Among them are provisions to continue to provide cost-effective mainframe service. The Organization will need to continue its programme of upgrading telecommunications capabilities to provide worldwide electronic communications services and network facilities, at both individual duty stations and between duty stations.

92. Also mentioned in the medium-term plan is the need to continue the provision of desktop and LAN equipment at duty stations outside of New York, where automation has lagged behind that of Headquarters. It is also considered necessary to promote the continued migration of departmentally managed databases to an open systems environment, which provides easy accessibility. This implies taking a coordinated approach to new developments, and the adoption of Organization-wide standards.

93. With the completion of the wiring infrastructure, it is expected that the Organization will continue to extend the use of local area networks at each of the duty stations where LAN service is available. Proprietary minicomputers will continue to be phased out in favour of UNIX and larger microcomputer-type servers which can be obtained from a wide variety of manufacturers. Continued reductions in the prices of LAN-based equipment and software will make this alternative even more desirable in the future.

94. The United Nations has long held a mandate to operate its own telecommunications system. In 1947, the International Telecommunication Convention accorded the United Nations the same rights and privileges as members of the International Telecommunication Union (ITU) for operating telecommunications services, thus giving the United Nations de facto Union membership. Following the decision of the ITU Plenipotentiary in 1989 to enable the specialized agencies to obtain access to the United Nations telecommunications system, informal consultations were initiated with the Organization's satellite communications vendor with a view to expanding the scope of the existing space segment lease agreement so as to include the use of the satellite communications system by the specialized agencies.

95. The United Nations is currently in the process of reviewing the technical and economic implications of a substantially expanded network which would provide satellite service to all major United Nations locations as well as to those locations which have a significant Organization presence. The concept of supporting other United Nations organizations has been discussed with the major telecommunication users, all of whom have expressed an interest in taking advantage of the lower costs and improved service quality that such a network should provide.

96. In order to consider further the expansion of the United Nations telecommunications network to carry the traffic of other United Nations agencies, a study was commissioned to examine the critical issues related to costing, organizing and implementing a system of global dimensions. Because of the difficulty in obtaining data on current telecommunications traffic from the agencies, the projections made in the present study were made on the basis of a statistical model of a global telecommunications network. The results of this study, which were based on conservative assumptions of traffic volume and cost, indicate that the United Nations family of organizations could save approximately 50 per cent of their combined telecommunications costs if a global network were to be introduced and used by all participants.

97. In order to provide a more accurate estimate of the costs and benefits of an inter-agency telecommunications network, reliable data on traffic volumes must be obtained. From this, the costs for implementing the system can be obtained and a proposed project plan can be developed. It is expected that the work needed for the preparation of this proposal, showing the cost benefits of an inter-agency network, can be prepared by the second quarter of 1993. A special report by the Secretary-General will be issued separately requesting consideration of this proposal by Member States.

98. Access to United Nations databases by Member States has become an issue of sufficient importance to have been included for discussion in the 1992 substantive session of the Economic and Social Council, as well as being an item included in the medium-term plan. In a recent report to the Economic and Social Council (E/1992/78), a number of solutions are proposed which, when implemented, are expected to provide Member States with access to the kinds of information which a detailed questionnaire has shown to be of interest to them.

99. As requested by the Economic and Social Council in its resolution 1992/60, the proposals contained in the report of the Secretary-General to the Council would be implemented in phases. The initial phases of its implementation during 1992-1993 would be met from within existing resources and be carried out in full consultation with the representatives of Member States. The requirements for 1994-1995 would be considered in the context of the preparation of the proposed programme budget for that biennium, subject to the overall availability of resources and relative priorities in each programme.

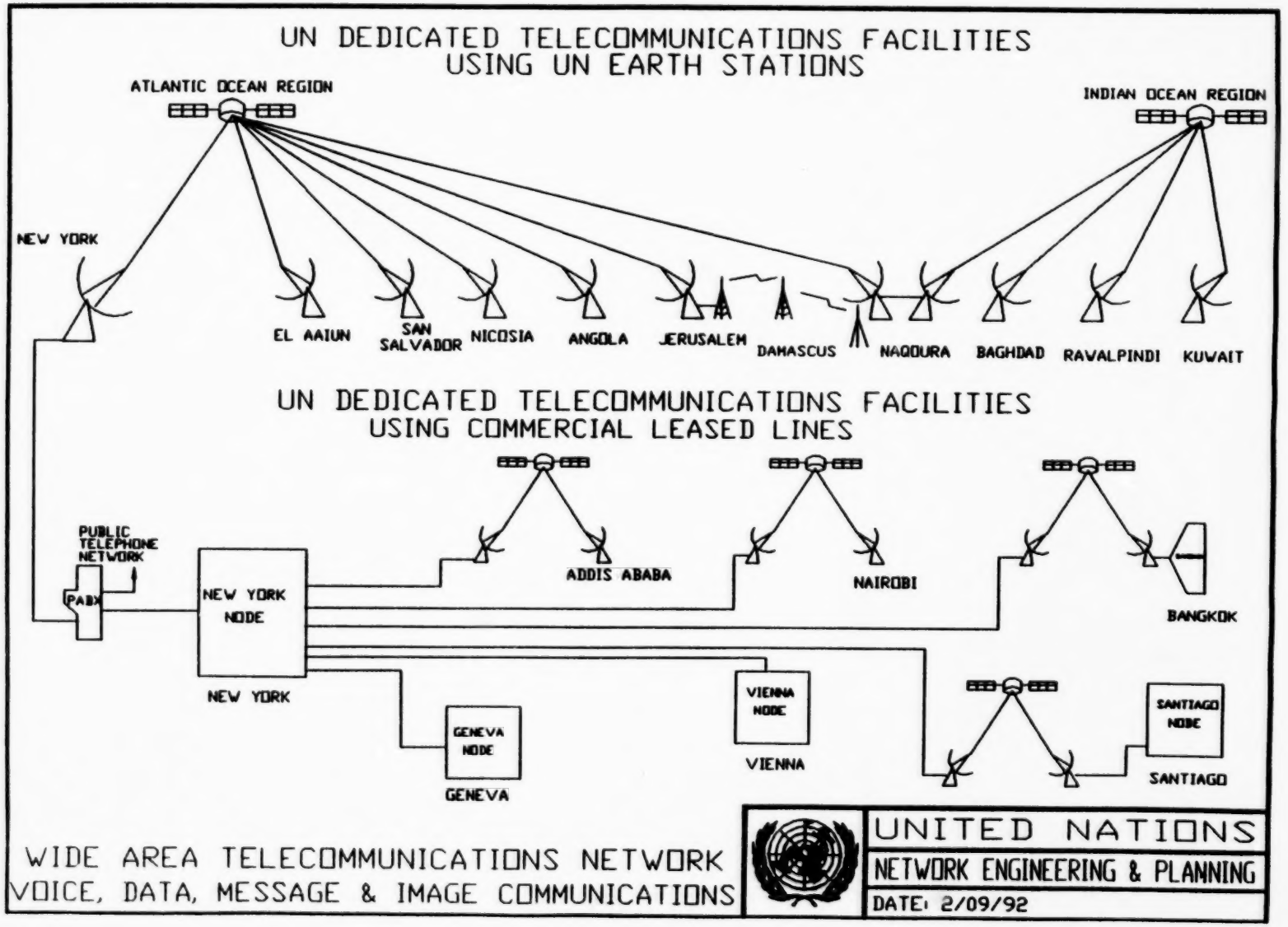
100. From a technological perspective, the most noteworthy aspect of the report of the Economic and Social Council is the inclusion of a totally new mechanism to facilitate the use of databases which would be resident on a wide range of computer platforms. Essentially, users from outside the Organization would access a single, special-purpose gateway computer which, in turn, would route them transparently to the application they wished to use, regardless of the actual computer on which the data were resident. Such an arrangement would ensure tight security for United Nations data and would simplify the task of communicating electronically from remote sites.

101. With many organizational changes now taking place, it has been found necessary to review the policies pertaining to archives and records management. An interdepartmental review group was established to examine the policies and procedures both for Headquarters and for other duty stations. Because of the fact that much more of the Organization's material is now stored in machine-readable format, a special task force has been created to look into issues related to electronic records management, and to coordinate policies set up in this area with those promulgated by the Technological Innovations Board. Results of this activity will be reported upon as work progresses.

102. In conclusion, the present report has emphasized the need to continue the programme of establishing a viable, global computer and telecommunications infrastructure for the United Nations. With this infrastructure in place, the Organization can benefit fully from a number of new technological developments which are now available. Since the last report on new technology, significant advances have been made to develop applications in both substantive and administrative areas of the Secretariat which utilize the networking facilities which are already functioning. Central to this is the desktop computer, which is becoming the vehicle for reaching out to share and integrate information available on a wide variety of computers, thus facilitating the timely delivery of organizational work programmes.

Notes

1/ Official Records of the General Assembly, Forty-fifth Session, Supplement No. 6 (A/45/6/Rev.1), vol. II, programme 43.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